

REMARKS/ARGUMENTS

Status of the Claims

Claims 1-3 and 6 remain in this application. Claims 4, 5, 7, and 8 are canceled without prejudice. Claims 1 and 6 have been amended. Applicant submits that support for the claim amendments can be found in the Specification as originally filed, and therefore no new matter has been added.

The Office Action

Claim 1 was rejected under 35 U.S.C. 102(b) as being anticipated by Streater (US 2003/0156651). Claims 2 and 3 were rejected under 35 U.S.C. 103(a) as being unpatentable over Streater in view of Wang (US 2003/0169816). Claims 5 and 6 were rejected under 35 U.S.C. 103(a) as being unpatentable over Streater in view of Streater (US 6,195,128 or Streater-B).

Claim 1 is not Anticipated by Streater

Claim 1, as amended, recites a method of compressing digital data comprising the steps of: (i) reading digital data as series of binary coded words representing a context and a codeword to be compressed; (ii) calculating distribution output data for the input data and generating variable length prefix codewords for each combination of context and input codeword so as to form a respective transition table of local codewords for each context, in a manner which reserves logical codeword space at the long end to represent any new input codewords, which have not yet occurred with that context, as they occur for the first time; and (iii) recalculating the codewords from time to time, in order to continuously update the codewords and their lengths.

The amendments to claim 1 have been drawn from paragraph [0018] of the specification as filed. The amendments to claim 1 clarify that the method creates a plurality of transition tables, one transition table for each context. This enables the same codeword to appear in different contexts in its appropriate frequency for that particular context. These features are neither disclosed nor taught by the cited references and demonstrate a novel way of compressing data.

More particularly, US 2003/0158651 (Streater) in paragraph [0094] explains how each superblock (of 8x8 pixels) stores rare combinations of updated elements as exception codewords followed by an uncompressed codeword. The prior art codewords are pre-allocated, and the Huffman tables are stored at the start of each video section as a header.

Paragraph [0096] of Streater states that "[t]he super-block headers are encoded at the start of each of these video sections."

For each section, an optimal code is calculated to reduce the overall bit-length of the data. This is the prime aim of Huffman encoding, i.e., to provide an efficient encoding process by reducing the overall amount of data to be transferred. The most common codewords are Huffman encoded, and rare events are given exception codewords and sent "raw."

A "dictionary" comprising the pre-assigned codewords is first compiled and then sent from the encoder to the decoder. If the "dictionary" needs to be changed (re-written) due to a change in codeword frequency, it has to be re-sent from the encoder to the decoder again.

In the present application, the "dictionary" of codewords is not shared between the encoder and decoder, and it is not pre-calculated. Instead, it is dynamically calculated from the data at both the encoder and the decoder remotely. However, both encoder and decoder follow the same rules and are able to encode/decode the data without the need to communicate a "dictionary" between them. There are built-in gaps for data to be added if needed as new codeword and context combinations are encountered.

Huffman compression, as used in Streater, is optimal, and all space is allocated, leaving no gaps. Since the idea is to reduce the overall bit-length, each combination has a pre-allocated codeword. The space in Streater is not "reserved" at all, but rather it is pre-allocated to the rare codewords. This method of compressing digital data has at least the following two drawbacks:

- i) additional time is taken for the codeword frequencies to be re-assigned in the "dictionary"; and
- ii) additional time is taken for the codeword "dictionary" to be re-sent to the

receiver and the additional cost in data rate of re-sending the new tables.

The claimed invention bypasses these drawbacks by removing the need for a codeword "dictionary" to be compiled and communicated to the receiver. Instead, both the encoder and decoder encode and decode "on the go" respectively. While the gaps in the codeword allocation do result in the average bit length being longer than Huffman encoding, the time saved overall by not sending the "dictionary" so often more than makes up for the increased data length.

In the method disclosed in the present application, gaps have been left for common or rare groups, there being no differentiation with regard to the reserved space. Everything is deemed to be "rare" at the beginning because it has not been encountered yet, and only over time does the pattern of common/rare events build up.

The Huffman encoding described and used by the prior art is far less proficient at dealing with live video feeds unless the encoding is "prejudiced" to the data that it could encounter in the future. It is not dynamic, and it is unable to deal efficiently with changes in the video data to be encoded, unless it is able to inspect the data first and pre-allocate codewords based on their frequency.

This means that live video data cannot be streamed either without a delay or without using inefficient encoding. The old Huffman method disclosed by the prior art pre-allocates codewords before sending. The present method, however, allocates codewords as it goes, leaving gaps in the codeword sequence to return to later if needed, sacrificing bit-rate for CPU speed and making the overall encoding process more efficient by doing so.

Claim 1 patentably defines over the remaining applied references.

It is this difference that distinguishes the claimed invention from any teachings in the prior art.

In view of the foregoing, Applicant respectfully submits that claim 1 patentably defines the present invention over the citations of record. Further, the dependent claims (2, 3, and 6) should also be allowable for the same reasons as their respective base claim and further due to the additional features that they recite. Separate and individual consideration of the dependent claims is respectfully requested.

CONCLUSION

For at least the reasons detailed above, it is respectfully submitted all claims remaining in the application (Claims 1-3 and 6) are now in condition for allowance. The foregoing comments do not require unnecessary additional search or examination.

☒ Remaining Claims, as delineated below:

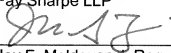
(1) FOR	(2) CLAIMS REMAINING AFTER AMENDMENT LESS HIGHEST NUMBER PREVIOUSLY PAID FOR		(3) NUMBER EXTRA
TOTAL CLAIMS	5	- 20 =	0
INDEPENDENT CLAIMS	1	- 3 =	0

☒ This is an authorization under 37 CFR 1.136(a)(3) to treat any concurrent or future reply, requiring a petition for extension of time, as incorporating a petition for the appropriate extension of time. Applicants hereby petition the Commissioner under 37 C.F.R. § 1.136(a) and request a onemonth extension of time to respond to the outstanding Office Action.

☒ The Commissioner is hereby authorized to charge any filing or prosecution fees which may be required, under 37 CFR 1.16, 1.17, and 1.21 (but not 1.18), or to credit any overpayment, to Deposit Account Number 06-0308.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he/she is hereby authorized to telephone the undersigned, at 216.363.9000.

Respectfully submitted,
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7/13/11

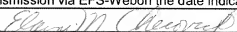
Date

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☒ transmitted to the USPTO by electronic transmission via EFS-Web on the date indicated below.

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Elaine M. Checovich